

New Species and Subspecies of Recent and Fossil *Amphidromus* Albers, 1850 from Java and Sumatra (Gastropoda: Camaenidae)

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ABSTRACT This paper presents two new species of subgenus *Amphidromus* Albers, 1850 and a new subspecies of subgenus *Syndromus* Pilsbry, 1900, all came from southern Sumatra, Indonesia; and a new fossil species of *Amphidromus* s.s. from Central Java, Indonesia.

KEY WORDS *Amphidromus*, *A. dancei*, *A. felixi*, *A. (Syndromus) porcellanus gistingensis*, *A. ubaldii*, Indonesia

INTRODUCTION

Specimens of the first new species of subgenus *Amphidromus* Albers, 1850 were collected by a native man from Lahat Regency, South Sumatra Province. Shells are large, dextral or sinistral; and comparable with *A. javanicus* (Sowerby, 1841) from western Java and *A. puspa* Dharma, 1993 from central Sumatra.

The second new species of *Amphidromus* s.s. described is based on two dead collected shells, both dextral, found near the shoreline in South Bengkulu Regency, Bengkulu Province, Sumatra. Shell outline is ovate elongate with a slight prolongation of the columellar margin, which distinguishes it from other species of *Amphidromus* s.s. and comparable with *A. (Syndromus) beccarii* Tapparone-Canefri, 1883 from South Sulawesi. The shells were previously used by hermit crabs, suggesting that the habitat of the snail is close to the beach.

In this paper, a new record of *Amphidromus (Syndromus) porcellanus porcellanus* (Mousson, 1848) is reported from Belitung Island, off southeastern Sumatra. The new subspecies of *A. (S.) porcellanus* is distinguished from the nominate subspecies by having some character differences such as: slightly more robust and

somewhat thicker shell, apex not black, and no radial pattern on the last whorl. Specimens of the new subspecies came from the southwestern part of Lampung Province, South Sumatra, and have a different locality from the nominate subspecies.

The new fossil species of *Amphidromus* s.s. is from Sangiran, Central Java, Late Pliocene; all seven specimens examined are dextral. The shell is small compared to the other species of the subgenus, shell height 31.9-34.9 mm, comparable with the fossil species *A. sangiranensis* Dharma, 2007 that also comes from Sangiran, Central Java and *A. alticola* Fulton, 1896 from West Java.

ABBREVIATIONS

- MZB Museum Zoologicum Bogoriense,
Cibinong, Bogor, Indonesia
SMF Senckenberg Forschungsinstitut und
Naturmuseum, Frankfurt, Germany
BD Bunjamin Dharma's collection

h = height, d = diameter, ha = height of aperture,
hlw = height of last whorl.

SYSTEMATICS

- Family : Camaenidae Pilsbry, 1895
 Subfamily : Camaeninae Pilsbry, 1895
 Genus : *Amphidromus* Albers, 1850
 Subgenus : *Amphidromus* Albers, 1850; type species: *Helix perversa* Linnaeus, 1758
 Subgenus : *Syndromus* Pilsbry, 1900; type species: *Helix contraria* Müller, 1774

Amphidromus dancei Dharma, new species
 (Figures A, B, 1-3)

Description. Shell moderately large, up to 59.1 mm, dextral or sinistral, high conical or rather ovate conical, thick, a little transparent and slightly polished. Whorls $5\frac{3}{4}$ - $6\frac{3}{4}$, regularly increasing in size and slightly convex. Apex white, smooth and shiny. Suture shallow, somewhat crenulated by terminations of rather coarse radial rugae; spiral sculpture very weak. Ground color yellow, last whorl decorated with irregularly spaced radial brown stripes that reach the suture, and bold radial brown stripes that mark growth-arrests. Aperture ovate, oblique and pale yellow to yellowish gray inside, showing external stripes. Perch angle 26° - 35° . Parietal callus thin and colorless, sometimes whitened at the margin. Peristome not continuous, white; outer lip expanded, thickened and recurved; columella thick, vertical. Umbilicus nearly closed, partially concealed by a folded and broadened columellar margin.

Measurements: h = 54.8-59.1 mm, d = 29.9-33.1 mm, ha = 30-34 mm, hlw = 40.8-44.3 mm, h/d = 1.68-1.98, ha/h = 0.53-0.59, hlw/h = 0.72-0.77.

Animal body light gray, reticulated, the recessed parts grayish brown, head orange, foot orange

then gray and whitish on the edges, tentacles grayish brown, eyes transparent light cream.

Type Material. Holotype MZB Gst. 22.030, h = 54.8 mm; 3 paratypes MZB Gst. 22.031, h = 57.7 mm, 58.6 mm and 45.1 mm (juvenile); 3 paratypes SMF 363005, h = 56.3 mm, 58.5 mm and 46.4 mm (juvenile); 4 paratypes BD, h = 59.1 mm, 55.3 mm, 57.7 mm and 55.2 mm.

Type Locality. Lahat Regency, South Sumatra Province, Indonesia.

Distribution. Only known from the type locality.

Habitat. On trees in the forest.

Etymology. Named after Peter Dance, England.

Discussion. *Amphidromus dancei* n. sp. differs from *A. javanicus* and *A. puspae* by having a more expanded outer lip. In comparison, *A. javanicus* from Java on average has a larger shell with height up to 67 mm, ground color is white or yellowish, and the umbilicus is usually closed. In comparison, *A. puspae* has high conical shell with fine radial rugae, decorated with radial lines and no radial stripes or streaks, parietal callus is dark brown or purplish brown, and the umbilicus is closed or nearly closed. Two live taken specimens of *A. dancei* n. sp. consisting of one adult (Figure A, apex broken) and one juvenile (Figure B), are still alive when this paper was written (paratypes, BD).

Amphidromus felixi Dharma, new species
 (Figures 4-5)

Description. Shell moderately large, up to 56 mm, dextral, ovate elongate and conical to apex, rather slender, of medium thickness and a little transparent. Apex and spire sculptures slightly abraded. Whorls about $6\frac{1}{2}$, with quite

different degrees of whorl increment, whorls slightly convex; spire short. Last whorl elongated, somewhat inflated near suture and sub-rectangular, height about three-quarters of total shell height. Suture shallow, somewhat crenulated by terminations of coarse radial rugae; spiral sculpture very weak. Ground color white, brown growth-arrest stripes possible, subsutural zone whitish. Aperture ovate elongate, height about half of the shell height, oblique, white inside. Perch angle 24° - 26° . Parietal callus rather thick, white or thin, colorless. Peristome not continuous, white; outer lip expanded, thickened and recurved; columella thick, vertical, and its insertion with a slight prolongation. Umbilicus open or nearly closed, partially concealed by a folded and broadened columellar margin.

Measurements: $h = 56$ mm, 54.8 mm; $d = 27$ mm, 25.8 mm; $ha = 28.2$ mm, 29.6 mm; $hlw = 40.2$ mm, 42 mm; $h/d = 2.12$, 2.15; $ha/h = 0.51$, 0.53; $hlw/h = 0.73$, 0.75.

Type Material. Holotype MZB Gst. 22.032, $h = 56$ mm; paratype BD, $h = 54.8$ mm.

Type Locality. Near coast in South Bengkulu Regency, Bengkulu Province, Sumatra, Indonesia.

Distribution. Only known from the type locality.

Habitat. The two shell specimens of *A. felixi* n. sp. were found by a hermit crab collector in South Bengkulu Regency, Bengkulu Province, Sumatra. Those shells were found inhabited by the hermit crab *Coenobita cavipes* Stimpson, 1858 near the shoreline; these crabs can roam quite far into the forest, up to 500-1,000 m from the shoreline. Perch angle of *A. felixi* n. sp. is small, 24° - 26° , indicating that the snails like to perch on leaves.

Etymology. Named after Felix Wang of Jakarta, Indonesia.

Discussion. *Amphidromus felixi* n. sp. differs from other species of *Amphidromus* s.s. by having quite different degrees of whorl increment, last whorl elongated and somewhat inflated near the suture, aperture ovate elongate, spire short, and perch angle small. This new species of *Amphidromus* s.s. is comparable with the sinistral and slender shells of *A. (S.) beccarii* from South Sulawesi. Shells have a similar shape, sculpture and columella, some may have a columellar prolongation (Laidlaw and Solem, 1961; figure 30). Measurements of two *A. (S.) beccarii* specimens from South Konawe, South Sulawesi: $h = 42.5$ mm, 44.5 mm; $d = 20.7$ mm, 19.2 mm; $ha = 21.5$ mm, 22 mm; $hlw = 30.2$ mm, 31.5 mm; perch angle 36° , 30° ; $h/d = 2.05$, 2.32; $ha/h = 0.51$, 0.49; $hlw/h = 0.71$, 0.71.

Amphidromus (Syndromus) porcellanus
porcellanus (Mousson, 1848)
 (Figures 12-16, D image on the right)

Description: Shell small, up to 32 mm, sinistral, slender, thin, transparent and smooth. Whorls 6-7, regularly increasing in size, slightly convex. Apex dark brown to black, smooth and shiny. Suture shallow, somewhat crenulated by terminations of fine radial rugae; spiral sculpture very weak. Ground color cream or straw yellow, last whorl decorated with radial brown streaks or flames that vary in number, about 10-23; streaks divided at the periphery of each whorl and do not reach the suture, a pale spiral zone along the upper part of each whorl, and a yellow line or band below suture. Two brown spiral bands below periphery on the last whorl, a pale area around umbilicus. Aperture oblique, ovate; white inside with external brown streaks and spiral bands visible. Perch angle

27°-30°. Parietal wall overlaid by thin callus. Peristome not continuous, white; outer lip slightly expanded, a little thickened and weakly reflected; columella rather thick, almost vertical. Umbilicus slightly open or nearly closed, partly concealed by a folded and broadened columellar margin.

Measurements: $h = 22.4\text{-}32\text{ mm}$, $d = 12\text{-}15\text{ mm}$, $ha = 10.2\text{-}13.8\text{ mm}$, $hlw = 15.1\text{-}20\text{ mm}$, $h/d = 1.85\text{-}2.19$, $ha/h = 0.41\text{-}0.48$, $hlw/h = 0.60\text{-}0.69$.

Material Examined. Banten Province (Western Java): Bojong, near Saketi; near Malimping. West Java Province: near Sukabumi; Kadudampit, Sukabumi; Bogor; Ciseeng, near Depok (dead taken); near Plered (dead taken); and Pawon Cave, Padalarang (dead taken). Lampung Province: Kotabumi; Way Kanan, Tulang Bawang Regency; and Sribawono. South Sumatra Province: near Baturaja; Blambangan, southwest of Baturaja; and Lahat Regency. Bangka Belitung Islands Province: Petaling, Mendo Barat, Bangka Island; Nibung, Puding Besar, Bangka Island; and Gunung Tajam, Belitung Island (fragment).

Type Locality. Java, Indonesia.

Distribution. Banten Province including Krakatau and Sebesi Islands, Sunda Strait between Java and Sumatra; West Java Province; Lampung Province; South Sumatra Province; and Bangka and Belitung Islands Province off southeastern Sumatra (see Map 1, marked as triangles on the geographical distribution map).

Habitat. On various trees, such as on banana leaves and coconut trees; also, coffee, pepper and bamboo plantations.

Discussion. The largest specimen examined is 32 mm in height, less than the largest recorded (34 mm) by van Benthem Jutting (1950; p. 493).

All specimens examined have dark brown to black apex. Three specimens from near Malimping, West Java have no brown radial streaks or flammules on the last whorl. A fragment of *A. (S.) p. porcellanus* was collected from the slope of Gunung Tajam, Belitung Island, southeast of Sumatra, and this is a new record for this species. A specimen of *A. (S.) p. porcellanus* was collected from Lahat Regency, South Sumatra Province, which is the northernmost place where this species can be found in Sumatra.

Amphidromus (Syndromus) porcellanus
gistingensis Dharma, new subspecies
(Figures 7-11, D image on the left)

- *Amphidromus porcellanus* - Dharma, 1987: p. 12, Fig. 2, no. 3.
- *Amphidromus (Syndromus) porcellanus* - Dharma, 1992: p. 118, pl. 37, fig. 8d, 8e.
- *Amphidromus (Syndromus) porcellanus* - Dharma, 1998: p. 8-9, fig. right.
- *Amphidromus (Syndromus) porcellanus* - Dharma, 2005: p. 234, pl. 92, no. 8c.

Description: Shell rather small, up to 33.3 mm, sinistral, high conical, rather thin and smooth. Whorls 5½-6, regularly increasing in size and slightly convex. Apex whitish, smooth and shiny. Suture shallow, somewhat crenulated by terminations of fine radial rugae, and a yellow line below suture; spiral sculpture very weak. Ground color cream or straw yellow, some earlier whorls gray or ash-colored. Third, fourth, and fifth whorls usually with radial brown streaks or flammules, divided at the periphery; about 10 streaks on the fourth whorl. Last whorl has a monochrome straw yellow zone without streaks above the periphery, two spiral brown bands below the periphery and a pale area around umbilicus. Aperture oblique, ovate, white inside with two spiral brown bands visible. Perch angle 25°-30°. Parietal wall overlaid by thin callus. Peristome not continuous, white;

outer lip slightly expanded, a little thickened and weakly reflected; columella rather thick, almost vertical. Umbilicus open or nearly closed, partially concealed by a folded and broadened columellar margin.

Measurements: $h = 24.3\text{--}33.5$ mm, $d = 13.7\text{--}18.9$ mm, $h_a = 11.7\text{--}18.2$ mm, $hlw = 16.6\text{--}21.5$ mm, $h/d = 1.77\text{--}2.03$, $h_a/h = 0.46\text{--}0.64$, $hlw/h = 0.65\text{--}0.68$.

Type Material. Gisting, Lampung Province: holotype MZB Gst. 22.033, $h = 30.1$ mm; 1 paratype MZB Gst. 22.034, $h = 28.9$ mm; 1 paratype SMF 363006, $h = 29.2$ mm; 1 paratype BD, $h = 33.5$ mm. Umbulbaru, Pugung, Lampung Province: 1 paratype MZB Gst. 22.035, $h = 29.4$ mm; 1 paratype SMF 363007, $h = 28.5$ mm; 1 paratype BD, $h = 32.6$ mm. Campangtiga, Kota Agung, Lampung Province: 1 paratype MZB Gst. 22.036, $h = 29.1$ mm; 1 paratype SMF 363008, $h = 24.3$ mm; 1 paratype BD, $h = 29.2$ mm. Sumurtujuh, Wonosobo, Lampung Province: 1 paratype MZB Gst. 22.037, $h = 29.8$ mm; 1 paratype SMF 363009, $h = 30.6$ mm; 1 paratype BD, $h = 29.2$ mm.

Type Locality. Gisting, Lampung Province, southern Sumatra, Indonesia.

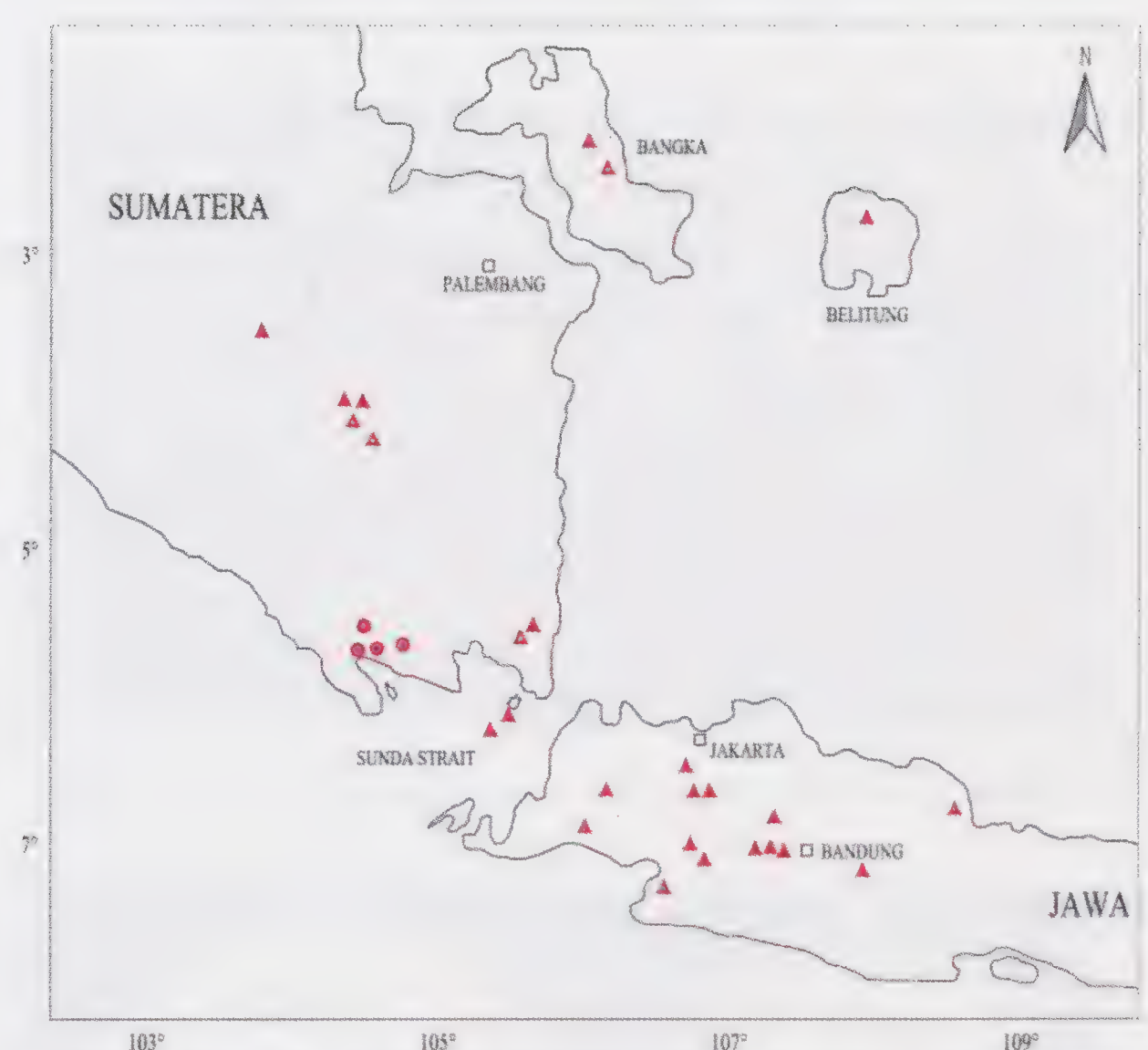
Distribution. Southwestern part (Tanggamus Regency) of Lampung Province, southern Sumatra, Indonesia (see Map 1. Marked as circles on the geographical distribution map).

Habitat. On leaves of banana plants, and various trees.

Etymology. Named after the type locality of this new subspecies.

Discussion. Of all the *A. (S.) porcellanus gistingensis* n. ssp. specimens examined, the apex is whitish and not dark brown or black as

seen on *A. (S.) p. porcellanus*, and the above the periphery on the last whorl has monochrome straw yellow color without streaks. In comparison with the nominate subspecies, shells of *A. (S.) p. gistingensis* n. ssp. are less slender, relatively thicker and slightly more robust with a slightly larger aperture. *A. (S.) p. gistingensis* n. ssp. was not found in the same location as *A. (S.) p. porcellanus* (see the geographical distribution map). Both *A. (S.) p. porcellanus* and *A. (S.) p. gistingensis* n. ssp. have never been found in the same location as *A. (S.) sumatranus* (von Martens, 1864) or *A. (S.) elvinae* Dharma, 2007.



Map 1. Geographical distribution map of *A. (S.) p. porcellanus* (triangle) and *A. (S.) p. gistingensis* n. ssp. (circle).

Amphidromus ubaldii Dharma, new species
(Figures 17-19)

Description: Shell small, height up to 34.9 mm, dextral, high conical or rather ovate conical with inflated last whorl, rather thin, not or little transparent, shining; spire somewhat tapering to apex. Whorls $5\frac{1}{2}$ –6, regularly increasing in size, some earlier whorls somewhat convex, more convex on the last whorl. Apex smooth and

shiny. Suture shallow, somewhat crenulated by terminations of fine or rather coarse radial rugae; spiral sculpture very weak. Aperture oblique, ovate; parietal callus rather thick. Perch angle 29° - 31° . Peristome not continuous; outer lip expanded or slightly expanded, a little thickened and reflected; columella rather thick, vertical. Umbilicus open or nearly closed, partly concealed by a folded and broadened columellar margin.

Measurements: $h = 31.9$ - 34.9 mm, $d = 16.1$ - 18.3 mm, $ha = 15.8$ - 17.2 mm, $hlw = 21.2$ - 23.9 mm, $h/d = 1.87$ - 2.06 , $ha/h = 0.47$ - 0.53 , $hlw/h = 0.64$ - 0.70 .

Type Material. Holotype MZB Moll. Fos. 0064, $h = 34.4$ mm; 1 paratype MZB Moll. Fos. 0065, $h = 31.9$ mm; 2 paratypes SMF 363010, $h = 33.1$ mm, 33.7 mm; 3 paratypes BD, $h = 32.5$ mm, 34.9 mm, 32.5 mm (spire broken).

Type Locality. Sangiran, Central Java, Indonesia, Late Pliocene.

Distribution. Only known from the type locality.

Etymology. Named after Dr. Roberto Ubaldi, Italy.

Discussion. Shells of fossil *A. ubaldii* n. sp. are very small among the other species in the group of *Amphidromus* s.s., shell outline with somewhat tapering spire and inflated last whorl. In comparison, shells of fossil *A. sangiranensis*, also from Sangiran, have an ovate conical outline, more convex whorls, thick outer lip, closed umbilicus, and larger size on average with shell height 33.5 - 41.0 mm. In comparison, the small sized recent species *A. alticola* from West Java has a shell with slightly more convex spire whorls and a closed umbilicus. Having found only dextral shells of *A. ubaldii* n. sp.,

raises the question of “does this species also have sinistral shells” because this new species was found in the same location as *A. sangiranensis*, which has dextral and sinistral shells. This description is only based on the seven dextral specimens collected; three of them incomplete. Additional specimens are required to confirm whether the sinistral form is present in this species.

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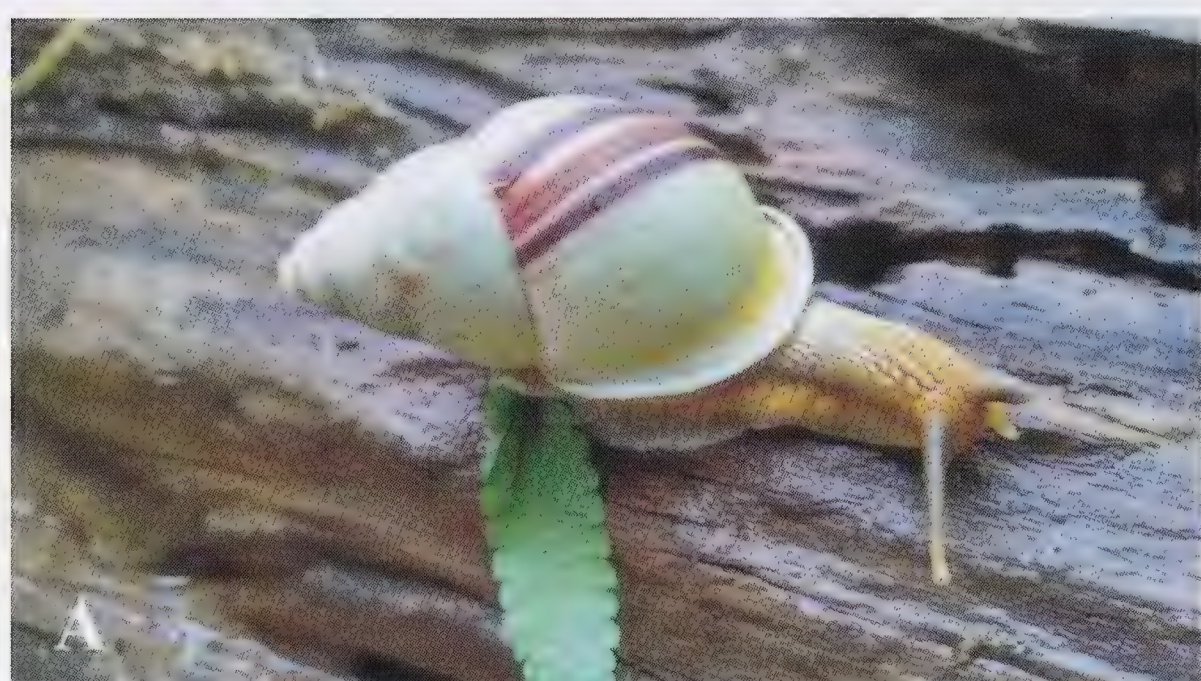


Figure A. *Amphidromus dancei* n. sp. paratype BD.



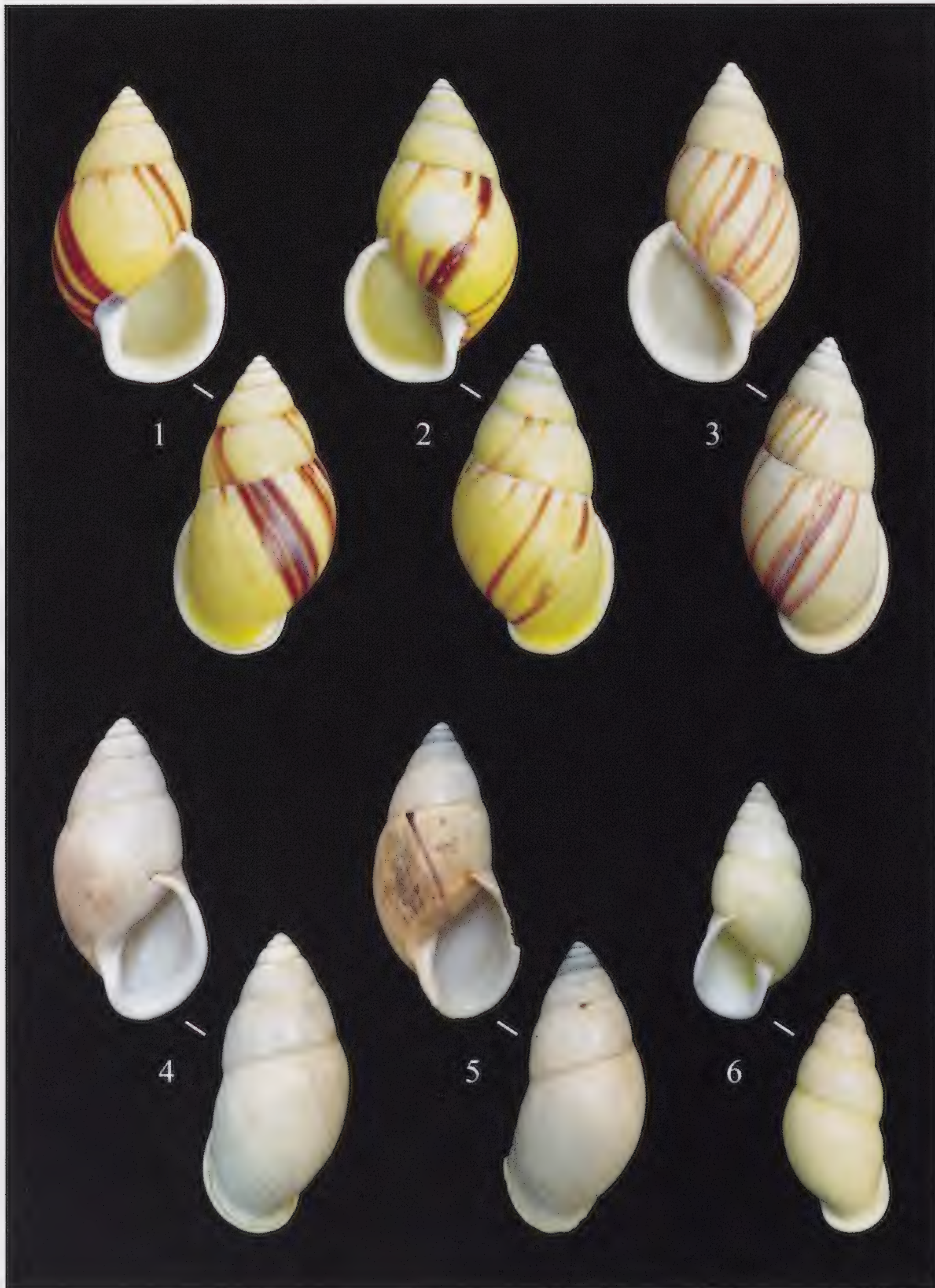
Figure B. Juvenile *Amphidromus dancei* n. sp. paratype BD.



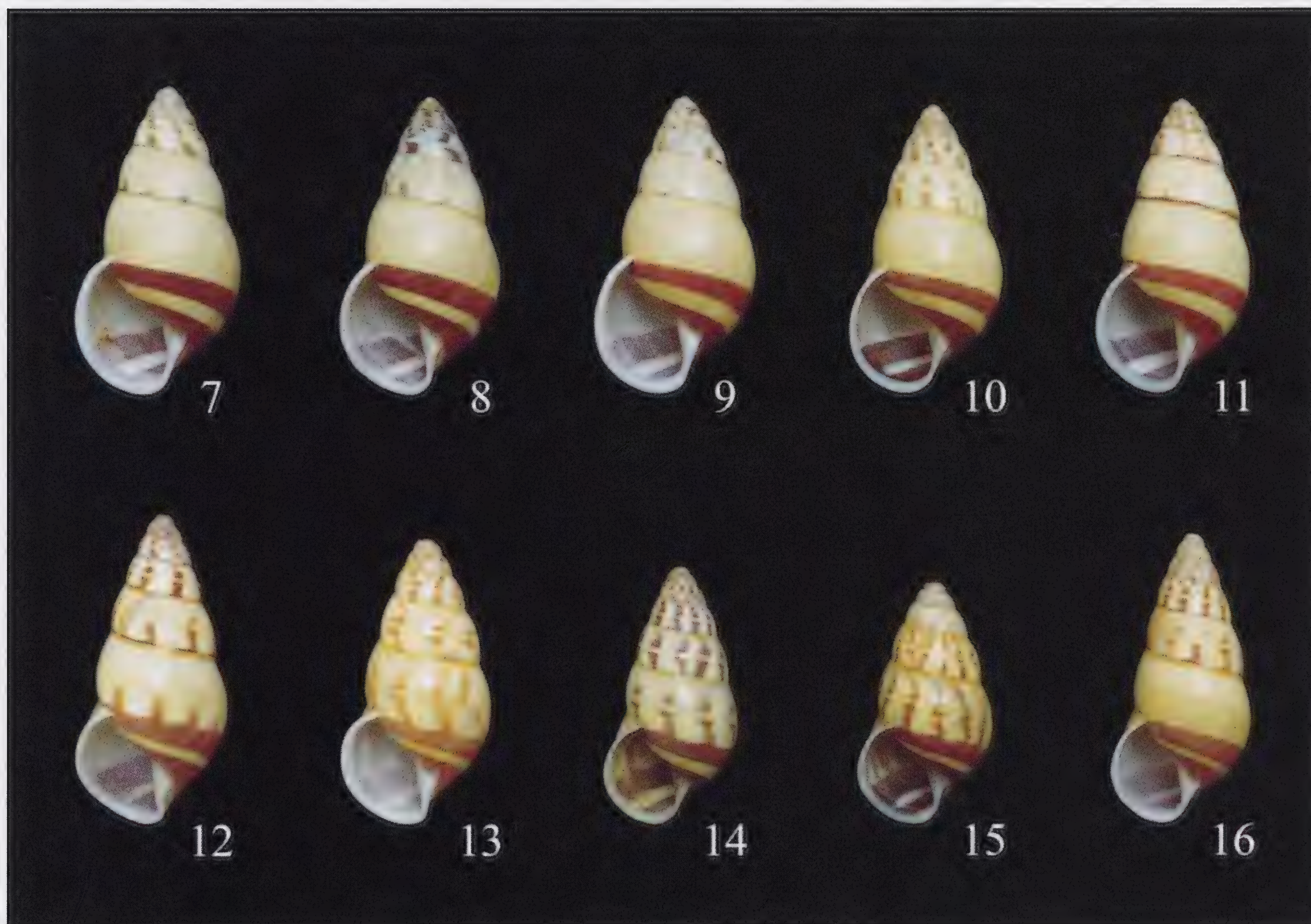
Figure C. *Amphidromus puspae* holotype MZB Gst. 9467.



Figure D. Apex detail. Left: *A. (S.) p. gistingensis* n. ssp.; Holotype, Gisting, Lampung, Sumatra. Right: *A. (S.) p. porcellanus*; near Malimping, West Java.



Figures 1-3. *Amphidromus dancei* n. sp. Lahat Regency, South Sumatra Province: 1. Holotype MZB Gst. 22.030, h = 54.8 mm; 2. Paratype SMF 363005, h = 56.3 mm; 3. Paratype BD, h = 59.1 mm. **4-5.** *A. felixi* n. sp. coast in the South Bengkulu Regency, Bengkulu Province, Sumatra: 4. Holotype MZB Gst. 22.032, h = 56 mm; 5. Paratype BD, h = 54.8 mm. **6.** *A. (S.) beccarii* South Konawe, South Sulawesi, h = 42.5 mm.



Top row: Figures 7-11. *Amphidromus (S.) porcellanus gistingensis* n. ssp.: **7.** Holotype MZB Gst. 22.033, Gisting, Lampung, h = 30.1 mm; **8.** Paratype MZB Gst. 22.036, Campangtiga, Kota Agung, Lampung, h = 29.1 mm; **9.** Paratype SMF 363006, Gisting, Lampung, h = 29.2 mm; **10.** Paratype SMF 363007, Umbulbaru, Lampung, h = 28.5 mm; **11.** Paratype BD, Sumurtujuh, h = 29.2 mm.
Bottom row: 12-16. *A. (S.) p. porcellanus*: **12.** near Sukabumi, West Java, h = 31 mm; **13.** Kotabumi, Lampung, h = 28.9 mm; **14.** Sribawono, Lampung, h = 26 mm; **15.** Nibung, Bangka, h = 24.6 mm; **16.** near Malimping, West Java, h = 29.4 mm.



Figures 17-19. *Amphidromus ubaldii* n. sp. Sangiran, Central Java, Late Pliocene: **17.** Holotype MZB Moll. Fos. 0064, h = 34.4 mm; **18.** Paratype SMF 363010, h = 33.1 mm; **19.** Paratype BD, h = 32.5 mm. **20.** *A. sangiranensis*, h = 35.5 mm.